

REMARKS/ARGUMENTS

Favorable reconsideration of the present application is respectfully requested.

New Claims 9-12 have been introduced. Of these, Claim 9 incorporates portions of the subject matter of Claims 1 and 2, Claim 10 is similar to Claim 9 but uses a means plus function limitation, Claim 11 is based upon Claims 9 and 6, and Claim 12 is based upon Claims 10 and 6.

Claims 7 and 8 have been allowed. Claims 1-6 have been rejected under 35 U.S.C. §103 as being obvious over U.S. patent 4,412,794 (Presley) in view of U.S. patent 5,242,325 (Nukushina), U.S. patent publication 2003/0184183 (Sakai), U.S. patent 6,483,212 (Mimura et al.), and U.S. patent 4,825,972 (Shimizu). According to the Office Action, Presley discloses all of the claimed features except for the first and second driving circuits, an AC motor, a sensor and a steering wheel, but that it would have been obvious to incorporate these features into Presley in view of the secondary references. However, Applicants respectfully submit that the shortcomings of Presley are more fundamental than those noted in the Office Action, and that Claims 1-6 and new claims 9-12 clearly define over these references.

Briefly, the claimed invention is directed to an electric motor, or a power steering system including such an electric motor, including windings formed into first and second systems which are able to be energized to rotate the rotor of the electric motor. Certain electric motor applications, such as the electric motor for a power steering system, require a fail-safe function such that the applications can continue to operate despite the failure of components of the system. For example, it has been known to provide a power steering system with two motors, the second of which provides a backup in case of failure of the first motor. The present invention, on the other hand, provides an electric motor which can provide the required backup, for example in a power steering system, without the need for a separate second electric motor.

According to the feature of the invention set forth in Claims 1-6 and 9-12, this is achieved by providing the rotor of the electric motor with two systems of windings (spiral wires). Moreover, the motor can be operated either by the energization of both systems of windings or by the energization of only one of the systems of windings. Therefore, the motor can be energized by only one of these systems of windings under abnormal conditions to thereby provide a fail-safe function (page 2, lines 18-24). For example, referring to the non-limiting embodiment of Figure 1, a first system of windings (spiral wires) 17A and a second system of windings (17B) are respectively connected to first and second driving circuits 12 and 13 which are actuated by a controller 11. The first and second systems of windings 17A and 17B are wound in reverse directions and are shifted by 180° in phase (page 5, lines 20-23). The rotor 25 may thus be rotated by either of the windings 17A or 17B upon the energization of the driving circuits 12 and 13 under normal conditions, but either winding system alone can drive the motor under abnormal conditions (page 7, lines 12-22).

The Examiner has alleged that Presley discloses a motor apparatus including wires mounted on the stator "and energized to rotate" the rotor of the motor. However, Presley is not directed to a motor having a rotating rotor, but instead discloses an actuator having a *non-rotating* rotor (column 4, lines 27-34). More specifically, referring to Figures 2 and 5 upon which the Examiner has relied, the rotor 24 of the actuator is able to oscillate in a floating manner *but is prevented from rotating* by the pins 60 mounted within the holes 82. Radial projections 80 of the rotor are alternatively attracted by the sequentially excited coils 76 and 78 located at the right and left hand sides of the projections 80 to thereby provide the oscillating motion shown in Figures 4A-4D. This rotor oscillation rotates the shaft 30 via the eccentric output gear 26.

Thus, with respect to Claim 1, in addition to the shortcomings noted by the Examiner, Presley fails to even disclose an electric motor having a rotor and spiral wires "energized to

rotate said rotor." Thus, Presley is not even remotely related to the present invention and so those skilled in the art would not have found it obvious to have modified Presley in accordance with the claimed invention.

With respect to Claim 2, Presley suffers from the additional shortcoming that it is incapable of functioning by the energization of only one of the two groups of spiral wires ("said controller controls said driving circuits to rotate said rotor by only one of two groups of said spiral wires where the other remaining group of said spiral wires is in abnormal condition"). As is evident from Figures 4A-4D of Presley, oscillation of the rotor requires sequential energization of the coils 76 and 78. Neither such oscillation nor any non-disclosed rotation of the rotor is achieved by the energization of only one of the two groups of windings.

The above remarks also apply to new Claims 9-12. For example, all of the new claims recite a rotatably mounted rotor. Additionally, Claims 9 and 11 recite that the first and second winding systems are arranged such that the rotor can be rotated by the energization of either one of the first and second winding systems or by the energization of both of the first and second winding systems; Claims 10 and 12 recite "means including first and second driving circuits for rotating said rotor by the energization of either one of said first and second winding systems or by the energization of both of said first and second winding systems." Here again, Presley fails to disclose windings arranged to rotate -- or even oscillate -- the rotor by the energization of only one of the winding systems 76 or 78. It therefore fails to teach the subject matter of Claims 1-6 and 9-12 or to provide the fail-safe advantages thereof.

As for the secondary references, Nukushina was cited to teach first and second driving circuits at Figure 4. However, while Figure 4 of Nukushina discloses first and second electrical driving means 31a and 31b, the separate driving means do not drive first and second

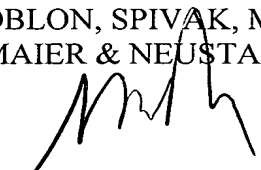
winding systems of a motor but instead respectively drive the vane 16 or the vane 17 (column 5, lines 36-58). This has no relevance to separate driving circuits for separate systems of windings in an electric motor and so could provide no teaching for such a modification in Presley. In any case, Nukushina provides no teaching for overcoming the other shortcomings of Presley as set forth above.

Sakai et al. was cited to teach an AC motor. However, this feature is only found in the dependent Claim 4 and not in Claim 1 from which it depends. Any teaching of an AC motor in Sakai et al. would thus be irrelevant to the shortcomings of Presley with respect to Claim 1. The same is true for the references to Mimura et al. and Shimizu which were respectively cited to teach the sensor of the dependent Claim 4 and the steering and steered wheels of the dependent Claim 6.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early notice of allowability.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Gregory J. Maier
Attorney of Record
Registration No. 25,599

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)
RTP/rac

Robert T. Pous
Registration No. 29,099